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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/893,264	06/27/2001	Nir N. Shavit	112047-0036	1888

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EXAMINER

TANG, KENNETH

ART UNIT	PAPER NUMBER
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2195

DATE MAILED: 04/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/893,264

Applicant(s)

SHAVIT ET AL.

Examiner

Kenneth Tang

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-57 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-9, 11-19, 21-23, 25-33, 35-37, 39-47, 49-51, and 53-57 is/are rejected.
- 7) ☒ Claim(s) 6, 10, 20, 24, 34, 38, 48 and 52 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This application is in response to the Amendment filed on 12/27/04. Applicant's arguments have been fully considered but were not found to be persuasive.
2. Claims 1-57 are presented for examination.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 11, 25, 39, and 53 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: "when taken together" refers to the "status-word fields" when it is really the status-word field contents (line 19 from claim 1) that should be taken together.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. **Claims 1-5, 7-9, 11-19, 21-23, 25-33, 35-37, 39-47, 49-51, and 53-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Blelloch et al. (hereinafter Blelloch) (US 6,434,590 B1) in view of Kawachiya et al. (hereinafter Kawachiya) (US 2001/0025295 A1).**

2. As to claim 1, Blelloch teaches a computer system that employs a plurality of threads of execution to perform a parallel-execution operation in which the threads identify tasks dynamically and in which the computer system comprises:

A) a separate status-word field (status buffers SB1) with each of the threads (*col. 5, lines 22-35*); and

B) a mechanism that operates the threads in a manner that each thread (*col. 5, lines 19-47*):

i) executes a task-finding routine to find tasks previously identified dynamically and performs tasks thereby found, with its status-word field containing a value indicating it is active (live tasks), until the task-finding routine finds no more tasks (*col. 12, lines 3-15, col. 13, lines 47-65*);

ii) when the task-finding routine finds no more tasks, sets the contents of its status-word field a value indicating it is inactive (updates the status buffer SB1) (*col. 5, lines 19-48*);

iii) while the status-word field associated with any other thread contains a value indicating that the other thread is active, searches for a task, and, if it finds one, sets (updates) its status-word field contents to a value indicating that it is active before attempting to execute a task (*col. 5, lines 19-48*); and

iv) if none of the status-word fields contains an activity-indicating value, terminates (operation ends) its performance of the parallel-execution operation (*col. 5, lines 40-52*).

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3. Blelloch teaches using a buffer manager BM1 to manage the various status buffers SB1 (contains the status-word field) (*col. 5, lines 22-35*) but fails to explicitly teach using a mechanism (global status word) that associates with the separate status-word field of the threads. However, Kawachiya teaches a parallel processing garbage collection system that uses global reference objects of states/status associated and substituted with other objects of states/status (*page 2, [0020]*). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include the feature of using a global status word that associates with the separate status-word field of the threads because this would increase the control of the system by allowing the thread to detect the occurrence of a condition whereby the state of object should be changed (*page 2, [0020]*).

4. As to claim 2, Kawachiya teaches a computer system wherein the parallel-execution operation is a garbage-collection operation (*page 1, [0014]*).

5. As to claim 3, Blelloch teaches a computer system as defined in claim 1 wherein:
A) each thread has associated with it a respective work queue in which it places task identifiers of tasks that identifies dynamically; B) the task-finding routine executed by an executing thread includes performing an initial search for a task identifiers in the work queue associated with the executing thread and, if that work queue contains no task identifiers that the executing thread can claim, thereafter performing a further search for a task identifier in at least one other task-storage location (*col. 5, lines 19-52, col. 12, lines 3-15, col. 13, lines 47-65*).

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6. As to claim 4, Kawachiya teaches a computer system wherein the parallel-execution operation is a garbage-collection operation (*page 1, [0014]*).

7. As to claim 5, Blelloch teaches a computer system wherein the at least one other task-storage location includes at least one work queue associated with a thread other than the executing thread (*col. 5, lines 19-52*).

8. As to claim 7, Blelloch in view of Kawachiya fails to explicitly teach wherein the task-finding routine includes selecting in a random manner the at least one work queue associated with a thread other than the executing thread. However, "Official Notice" is taken that both the concept and advantages of providing that selecting in a random manner at least one work queue associated with a thread other than the executing thread is well known and expected in the art. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include selecting in a random manner at least one work queue associated with a thread other than the executing thread to the existing system in order to ensure an unbiased selection.

9. As to claim 8, Blelloch teaches wherein the further search includes repeatedly searching a work queue associated with a thread other than the executing thread until the executing thread thereby finds a task or has performed a number of repetitions equal to a repetition limit greater than one (*col. 5, lines 19-52*).

10. As to claim 9, it is rejected for the same reasons as stated in the rejection of claim 7.

11. As to claim 11, Blleloch teaches wherein the status word fits in a memory location accessible in a single machine instruction (every action requires a single time step to be executed) (*col. 11, lines 12-15*).

12. As to claim 12, Blleloch teaches a computer system wherein the parallel-execution operation is a garbage-collection operation (*page 1, [0014]*).

13. As to claim 13, Blleloch teaches wherein each status-word field is a single-bit field (flag) (*col. 6, lines 44-67*).

14. As to claim 14, Blleloch teaches wherein the activity-indicating value is a logic one and the inactivity-indicating value is a logic zero (flag) (*col. 6, lines 44-67*).

15. As to claims 15-19 and 21-23, they are rejected for the same reasons as stated in the rejection of claims 1-9.

16. As to claims 25-28, they are rejected for the same reasons as stated in the rejection of claims 11-14.

17. As to claims 29-33, they are rejected for the same reasons as stated in the rejection of claims 1-5.

18. As to claims 35-37, they are rejected for the same reasons as stated in the rejection of claims 7-9.

19. As to claims 39-42, they are rejected for the same reasons as stated in the rejection of claims 11-14.

20. As to claims 43-47 and 49-51, they are rejected for the same reasons as stated in the rejection of claims 1-9.

21. As to claims 53-56, they are rejected for the same reasons as stated in the rejection of claims 11-14.

22. As to claim 57, it is rejected for the same reasons as stated in the rejection of claim 1.

Allowable Subject Matter

23. Claims 6, 10, 20, 24, 34, 38, 48, and 52 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Response to Arguments

24. In response to applicant's argument (page 20) that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., "assist other threads that are still processing tasks by effectively assuming responsibility for processing some of the related tasks of these other threads" and that "the completion decision is made cooperatively by the threads and threads directly contact each other to shift processing responsibilities") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

25. *Applicant makes arguments on pages 20-22 that don't address the rejections made by the Examiner in the Office Action on 9/24/04.*

In response, the Applicant cites portions of the references that do not teach the claim language instead of arguing the portions cited by the Examiner of the references that do teach the claimed limitations. Applicant's arguments are found to be unpersuasive.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth Tang whose telephone number is (571) 272-3772. The examiner can normally be reached on 8:30AM - 6:00PM, Every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Kt
3/31/05



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